

SUPPORT FOR THE AMENDMENTS

Claims 8, 11-13, and 26 were previously canceled.

Claims 7 and 9 are canceled herein.

Claims 1 and 10 have been amended.

Support for the amendment to Claims 1 and 10 is found in the corresponding claims as originally filed, as well as in Claims 7 and 9.

No new matter has been added.

REMARKS

Claims 1-6, 10, and 14-25 are pending in the present application.

The rejection of Claims 1-7, 9, 10, and 14-25 under 35 U.S.C. §102(b) over Ozutsumi et al (US 3,979,320) is obviated by amendment.

Applicants make no statement with respect to the propriety of the Examiner's allegations as to the previously pending claims and in no way acquiesce to the same. Solely to expedite examination of this application, Applicants have amended the claims herein to incorporate the subject matter of Claims 7 and 9.

Currently presented Claim 1 is directed at a composition comprising a liquid crystal material and an additive, wherein said additive is capable of forming a complex with said liquid crystal material, wherein said additive, when viewed on its own, has no permanent dipole or a dipole of not more than 0.1 Debye, wherein said additive is present in a certain amount, and wherein said additive gains a dipole in the presence of said liquid crystal material and upon complex formation with said liquid crystal material. Applicants respectfully submit that Ozutsumi et al does not anticipate and/or render obvious the claimed invention.

The Examiner cites Ozutsumi et al, which discloses a "liquid crystal composition capable of spontaneously forming therein a homogenous alignment of liquid crystalline molecules", which comprises a liquid crystal material and an additive selected from a group of specific heterocyclic structures. A feature that the additive forms a complex with the liquid crystal material and, in particular, gains a dipole upon complex formation is not part of the disclosure of Ozutsumi et al. Such effects depend on conformational changes of the additive upon complex formation with the liquid crystal material (see page 13, lines 30-32 of

the present specification: “Some dopants (e.g. L20) have no dipolar moment. However, when placed in an LC (or anisotropic solvent) the molecule of the dopant undergoes a conformation change, and the molecule becomes polar.”).

The additives used by Ozutsumi et al are structurally rigid compounds without extended carbon chains or other groups of comparable structural flexibility. As a result, these additives do not allow for sufficient conformational changes to have a significant effect on the dipole character of the molecule or complex. Consequently, the structural feature of an additive with no dipole that gains a dipole upon complex formation with the liquid crystal material is not part of the disclosure of Ozutsumi et al. Thus, Ozutsumi et al does not anticipate the subject matter of amended Claim 1 or the claims dependent therefrom.

Further, Applicants submit that the presently claimed invention would not even be obvious in view of Ozutsumi et al. With respect to non-obviousness, Applicants submit that in the composition according to the present invention, the additive, which has no or only a very weak permanent dipole when viewed on its own, gains a dipole upon complex formation with the liquid crystal material. In contrast thereto, the additives of Ozutsumi et al do not show this feature. This difference has the effect that the response times of the liquid crystals is reduced, while, at the same time, the dielectric anisotropy of the liquid crystals is improved (see page 9, lines 10-12 of the present specification: “The invention surprisingly reduces the response times (i.e. rise time, decay time, and grey scale response times) of liquid crystals (LCs), improves the dielectric anisotropy of liquid crystals, with the alignment of liquid crystal (LC) being unaffected.”) due to the change in overall dipole moment (Fig. 10). The gain in dipole moment of the dopant has the effect that the number and classes of additives available for use is significantly increased (see page 9, lines 14-16 of the present specification: “Furthermore, another advantage of the present invention is that the dipole

moment of the dopant is vastly improved through the proposed interaction of the additive, preferably the dopant and LC. This increases the number and classes of additives available for use.”).

Therefore, the problem underlying the present invention was to provide liquid crystal compositions formed from a liquid crystal material and an additive with no or only a very weak dipole, that show both an improved (reduced) response time and an improved (increased) dielectric anisotropy (see page 9, lines 18-20 of the present specification). A solution for this technical problem is provided by the subject matter of claim 1 of the present invention.

The solution of the present invention is neither disclosed nor suggested by Ozutsumi et al. In fact, Ozutsumi et al has a completely different goal (namely “to provide a liquid crystal composition capable of spontaneously forming therein a homogeneous alignment of the liquid crystalline molecules”, see column 4, lines 1-4), resulting in a direction of development that leads away from the solution of the present invention.

The effects observed by the present inventors are completely surprising and unexpected. Ozutsumi et al already includes an extensive list of additives, some of them without a permanent dipole. Having observed with these compounds that additives without a permanent dipole do not have the desired effects on the dielectric anisotropy, the skilled artisan would have had no incentive to even think about other additives without a permanent dipole.

Even if the skilled artisan, starting from Ozutsumi et al, were trying to arrive at the concept to improve the dielectric anisotropy of the liquid crystals, he/she would not have come up with the features of the present invention: It is completely counter-intuitive to include an additive without a dipole, in order to increase or even just influence the dipole

moment of a liquid crystal material and the dielectric anisotropy. Thus, devoid of any reasonable expectation of success, it is more than unlikely that the skilled artisan would have considered to include an additive without a dipole, in order to achieve his goals.

In view of the foregoing, Applicants submit that the subject matter of the presently claimed invention would not even be obvious over Ozutsumi et al. Withdrawal of this ground of rejection is requested.

Applicants submit that the present application is in condition for allowance. Early notification to this effect is respectfully requested.

Respectfully submitted,

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